

We claim:

1. An apparatus for pumping a well, comprising:

a submersible pump assembly adapted to be lowered into the well for pumping well fluid;

a packer mounted to the pump assembly, the packer being radially expansible from a retracted position to an expanded position for sealingly engaging casing of the well; and

a conduit leading from the pump assembly to the packer for delivering a portion of the well fluid flowing through the submersible pump assembly to the packer to move the packer to the expanded position in response to fluid pressure in the conduit created by the pump assembly.

2. The apparatus according to claim 1, wherein the packer is located below an intake of the pump assembly.

3. The apparatus according to claim 1, further comprising:

a bypass passage extending through the packer; and

a riser tube extending upward from the bypass passage and having an upper end above an intake of the pump assembly for flowing well fluid from below the packer out the riser tube and down to the intake of the pump assembly.

4. The apparatus according to claim 1, wherein the pump assembly comprises a plurality of centrifugal pump stages, and wherein the conduit leads to the packer from an intermediate one of the stages between lower and upper ones of the stages.

5. The apparatus according to claim 1, wherein the pump assembly comprises:

a centrifugal lower pump having at least one pump stage;

a centrifugal upper pump mounted in tandem with the lower pump and having a plurality of pump stages in excess of the lower pump; and wherein

the conduit extends from an upper end portion of the lower pump for diverting a portion of the well fluid flowing through the lower and upper pumps.

6. The apparatus according to claim 1, wherein the packer comprises an inflatable elastomeric element, and wherein the well fluid flowing from the conduit causes the elastomeric element to inflate.

7. The apparatus according to claim 1, wherein the packer comprises:

a central body; and

an elastomeric hose wrapped around the body a plurality of turns, the hose being in fluid communication with the conduit and being radially expansible.

8. The apparatus according to claim 1, wherein the packer comprises:

a central body;

an annular elastomeric bladder surrounding the body; and wherein

an interior of the bladder is in fluid communication with the conduit.

9. The apparatus according to claim 1, wherein the pump assembly comprises:

a pump;

a motor located below and operatively connected with the pump for driving the pump;
and wherein

the packer is located between the motor and the pump.

10. An apparatus for pumping a well, comprising:

a centrifugal pump assembly having an intake for receiving well fluid, the pump assembly adapted to be connected to a string of tubing for lowering the pump assembly into the well;

a packer mounted to the pump assembly below the intake, the packer being radially expandible from a retracted position to an expanded position for sealingly engaging casing of the well;

a conduit leading from the pump assembly above the intake of the pump assembly to the packer for diverting a portion of the well fluid flowing through the pump assembly to the packer to move the packer to the expanded position in response to fluid pressure in the conduit created by the pump assembly;

a bypass passage extending through the packer; and

a riser tube extending upward from the bypass passage and having an upper end above the intake of the pump assembly for flowing well fluid from below the packer out the riser tube and down to the intake of the pump assembly.

11. The apparatus according to claim 10, wherein the pump assembly comprises a plurality of centrifugal pump stages, and wherein the conduit leads to the packer from an intermediate one of the stages between lower and upper ones of the stages.

12. The apparatus according to claim 10, wherein the pump assembly comprises:

a centrifugal lower pump having at least one pump stage;

a centrifugal upper pump mounted in tandem with the lower pump and having a plurality of pump stages in excess of the lower pump; and wherein

the conduit extends from an upper end portion of the lower pump for diverting a portion of the well fluid flowing through the lower and upper pumps.

13. The apparatus according to claim 10, wherein the packer comprises an inflatable elastomeric element, and wherein the well fluid flowing from the conduit causes the elastomeric element to inflate.

14. The apparatus according to claim 10, wherein the packer comprises:

a central body; and

an elastomeric hose wrapped around the body a plurality of turns, the hose being in fluid communication with the conduit and being radially expansible.

15. The apparatus according to claim 10, wherein the packer comprises:

a central body;

an annular elastomeric bladder surrounding the body; and wherein

an interior of the bladder is in fluid communication with the conduit.

16. The apparatus according to claim 10, wherein the pump assembly comprises:

a pump;
an electrical motor suspended below and operatively connected with the pump for driving the pump; and wherein
the packer is located between the motor and the pump.

17. A method for pumping a well, comprising:

- (a) mounting a packer to a submersible pump assembly and lowering the packer and the pump assembly together into the well;
- (b) operating the pump assembly to cause well fluid to flow through the pump assembly to the surface; and
- (c) diverting a portion of the well fluid flowing through the submersible pump assembly to the packer, and moving the packer to an expanded position in sealing engagement with casing in the well in response to fluid pressure created by the pump assembly.

18. The method according to claim 17, wherein step (a) comprises mounting the packer below an intake of the pump assembly; and step (b) comprises:

providing a communication path through the packer and flowing well fluid from below the packer to a point above the intake of the pump assembly.

19. The method according to claim 17, wherein step (a) further comprises:

providing the packer with a bypass passage and a riser tube that extends upward above an intake of the pump assembly; and

step (b) comprises: flowing the well fluid from below the packer through the bypass passage, up the riser, and down to the intake.

20. The method according to claim 17, wherein:

step (a) comprises providing the pump assembly with a centrifugal pump having a plurality of stages;

step (b) comprises increasing the pressure of the well fluid flowing through the pump at each of the stages from an intake pressure to a discharge pressure; and

step (c) comprises diverting the well fluid from a point in the pump that is above the intake pressure and below the discharge pressure.